

PATENT COOPERATION TREATY



PCT

REC'D 07 MAR 2005

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference RSJ07840WO | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/GB2004/001431 | International filing date (day/month/year) 01.04.2004 | Priority date (day/month/year) 07.04.2003 |
| International Patent Classification (IPC) or national classification and IPC B05B5/025, B05B5/00 | | |
| Applicant AERSTREAM TECHNOLOGY LIMITED ET AL | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 9 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input checked="" type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | |
| Date of submission of the demand 04.11.2004 | Date of completion of this report 07.03.2005 | |
| Name and mailing address of the International preliminary examining authority:  <p>European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016</p> | <p>Authorized Officer</p> <p>Barré, V.</p> <p>Telephone No. +31 70 340-2987</p>  | |

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/001431

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-17 as originally filed

Claims, Numbers

1-23 as originally filed

Drawings, Sheets

1/5-5/5 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/001431

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
 - ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
 - ☐ the parts relating to claims Nos. .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|---------------------------------|
| Novelty (N) | Yes: Claims | 3, 5-11, 14, 15, 18-21 |
| | No: Claims | 1, 2, 4, 12, 13, 16, 17, 22, 23 |
| Inventive step (IS) | Yes: Claims | 3, 5-7 |
| | No: Claims | 1, 2, 4, 8-23 |
| Industrial applicability (IA) | Yes: Claims | 1-23 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/001431

Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)
and /or
2. Non-written disclosures (Rule 70.9)
see separate sheet

Re Item IV.

The separate inventions/groups of inventions are:

1-13

A spraying device with improved capillary spray electrode

14, 15

A method of manufacturing an electrode

16-23

A spraying device provided with cleaning means.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The prior art has been identified as document D2 (EP0853980) and discloses all the features of claim 1 and claim 2.

1. It follows that the following technical feature of claim 3 makes a contribution over the prior art and can be considered as a special technical feature (STF) within the meaning of Rule 13.2 PCT:

The focus is a rounded projection with a radius of curvature less than that of the spray electrode.

The problem solved by this special technical feature can therefore be construed as:
How to avoid multiple jet forming?

2. The second invention discloses a method of manufacturing an electrode. Its STF is considered to be the steps of cutting and etching a capillary. The problem to be solved by this feature is considered to be how to produce an electrode with the desired geometry?

3. The third invention is a spraying device, its STF is considered to be "a mechanism for applying a pulsed pressure wave to the fluid as it is sprayed". The problem to be solved by this feature is considered to be how to clean the capillary nozzle.

Also, examining the possible correspondence by technical effect, one finds that the technical effect of the first invention is a electrostatic spraying device producing one single jet, and that the technical effect of the second invention is a method providing electrodes of good geometrical precision, and that the technical effect of the third invention is a capillary which remains clean and unclogged.

This appears to show lack of corresponding technical effect as well. Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 3 different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V.

- 1 The following documents are referred to in this communication:
 - D1 : US 2002/149313 A1 (IMANISHI YASUO ET AL) 17 October 2002 (2002-10-17)
 - D2 : EP 0 853 980 A (PROCTER & GAMBLE) 22 July 1998 (1998-07-22)
 - D3 : EP 0 486 198 A (ICI PLC) 20 May 1992 (1992-05-20)
 - D4 : US 5 935 331 A (MATSUDA NAOKO ET AL) 10 August 1999 (1999-08-10)
 - D5: US-A-5 511 726 (GREENSPAN BERNARD J ET AL) 30 April 1996 (1996-04-30)

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. Document D1 discloses (the references in parenthesis applying to this document):

An electrostatic spraying device comprising a capillary spray electrode (3) having a spraying end (3-1), and a reference electrode (9), the electrodes being connected, in use, across a generator (5) in order to establish an electric field between the electrodes and cause fluid in the capillary to be sprayed from the spray electrode, wherein the spray electrode has a focus (3-1, 31-1) that defines a point at which the electric field is focussed on the spraying end.

The subject matter of claim 1 is therefore not new.

3 INDEPENDENT CLAIM 13

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 13 is not new in the sense of Article 33(2) PCT for substantially the same reasons as for claim 1.

4 INDEPENDENT CLAIM 16

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 16 is not new in the sense of Article 33(2) PCT.

Document D4 discloses (the references in parenthesis applying to this document, see e.g. figure 15):

An electrostatic spraying device comprising a capillary spray electrode (190) having a spraying end (147), and a reference electrode (151), the electrodes being connected, in use, across a generator (152) in order to establish an electric

field between the electrodes and cause fluid in the capillary to be sprayed from the spray electrode, wherein the device further comprises a mechanism (148) for applying a pulsed pressure wave to the fluid as it is sprayed from the spray electrode, thereby cleaning the spray electrode.

Therefore the subject matter of claim 16 is considered to lack novelty.

5 INDEPENDENT CLAIM 22

5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 22 is not new in the sense of Article 33(2) PCT for substantially the same reason as for claim 16

6 DEPENDENT CLAIMS 2, 4, 8-12, 17-21, 23

Dependent claims 2, 4, 8-12, 17-21, 23 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT) for the following reasons:

6.1 The subject matter of claims 2, 4 and 12 is also known from the same document D1 and is therefore lacking novelty (for claim 4, see e.g. in D1, fig.12, paragraph 75).

6.2 The features of claims 8-11 are merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to improve the efficiency of an electrostatic spraying device comprising capillary spray electrodes.

6.3 The subject matter of claims 17 and 23 is also known from the same document D4 and is therefore not new.

6.4 The subject matter of claims 18-21 is considered to lack inventive step since it refers to mere constructional details well known in the technical field, see e.g. D5.

7 DEPENDENT CLAIMS 3, 5-7

The combination of the features of dependent claims 3, 5-7 are neither known from, nor rendered obvious by, the available prior art. In claims 3, 5-7 it is

proposed to round the edge of the focus in order to avoid the creation of additional local focal points in the electric field thereby avoiding the formation of multiple jets. Claims 3, 5-7 seem to meet the requirements of the PCT with respect to novelty and inventive step.

8 INDEPENDENT CLAIM 14

- 8.1 Document D3, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document):

A method of manufacturing a spray electrode, the method comprising cutting (col. 9 line 19) or grinding a capillary at an oblique angle (see e.g. col. 1, line 49 - col. 2, line 2) to the longitudinal axis of the capillary to form a spray end, and the capillary is radiussed at the tip in order to round its edges (col. 9, line 20-24).

From this, the subject-matter of independent claim 14 differs by the step of etching the spray end.

The problem solved by the etching process is to round the sharp edges uniformly.

Pulling, cutting, grinding or etching are the most common operations when fabricating a capillary spray nozzle. The choice of an etching process is thus merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

Therefore the subject matter of claim 14 does not involve an inventive step in the sense of Article 33(3) PCT.

- 8.2 The subject-matter of claim 15 is known from the same document D3 and is therefore also considered to lack an inventive step.